Practitioner's Docket No. IL-10127B/LLNLP001 *PATENT*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of: Randall L. Simpson et al.

Application No.: 09/481,043 Group No.: 1793
Filed: 01/11/2000 Examiner: Felton, Aileen
For: PROCESS FOR PREPARING ENERGETIC MATERIALS

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Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

TRANSMITTAL OF APPEAL BRIEF
(PATENT APPLICATION--37 C.F.R. § 41.37)

1. Transmitted herewith, is the APPEAL BRIEF in this application, with respect to the Notice of Appeal filed on September 2, 2008.

2. STATUS OF APPLICANT

This application is on behalf of a small entity. A statement was already filed.

3. FEE FOR FILING APPEAL BRIEF

Pursuant to 37 C.F.R. § 41.20(b)(2), the fee for filing the Appeal Brief is:

small entity	$270.00
Appeal Brief fee due	**$270.00**

4. EXTENSION OF TERM

The proceedings herein are for a patent application and the provisions of 37 C.F.R. § 1.136 apply.

Applicant believes that no extension of term is required. However, this conditional petition is being made to provide for the possibility that applicant has inadvertently overlooked the need for a petition and fee for extension of time.

5. TOTAL FEE DUE

The total fee due is:

Appeal brief fee	$270.00
Extension fee (if any)	$0.00
TOTAL FEE DUE	**$270.00**

6. FEE PAYMENT

Authorization is hereby made to charge the amount of $270.00 to Deposit Account No. 50-1351 (Order No. LLNLP001).

7. FEE DEFICIENCY

If any additional extension and/or fee is required, and if any additional fee for claims is required, charge Deposit Account No. 50-1351 (Order No. LLNLP001).

Date: November 3, 2008

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PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the application of Simpson et al. Application No.: 09/481,043 Filed: 01/11/2000 For: PROCESS FOR PREPARING ENERGETIC MATERIALS (AS AMENDED)	Group Art Unit: 1793 Examiner: Felton, Aileen B. Attorney Docket No.: IL-10127B/LLNLP001 Date: November 2, 2008

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

ATTENTION: Board of Patent Appeals and Interferences

APPEAL BRIEF (37 C.F.R. § 41.37)

This brief is in furtherance of the Notice of Appeal, filed in this case on Sept. 2, 2008.

The fees required under § 1.17, and any required petition for extension of time for filing this brief and fees therefor, are dealt with in the accompanying TRANSMITTAL OF APPEAL BRIEF.

This brief contains these items under the following headings, and in the order set forth below (37 C.F.R. § 41.37(c)(i)):

I REAL PARTY IN INTEREST
II RELATED APPEALS AND INTERFERENCES
III STATUS OF CLAIMS
IV STATUS OF AMENDMENTS
V SUMMARY OF CLAIMED SUBJECT MATTER
VI GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

VII ARGUMENT

VIII CLAIMS APPENDIX

IX EVIDENCE APPENDIX

X RELATED PROCEEDING APPENDIX

The final page of this brief bears the practitioner's signature.

I REAL PARTY IN INTEREST (37 C.F.R. § 41.37(c)(1)(i))

The real party in interest in this appeal is Lawrence Livermore National Security, LLC.

II RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 41.37(c) (1)(ii))

With respect to other prior or pending appeals, interferences, or related judicial proceedings that will directly affect, or be directly affected by, or have a bearing on the Board's decision in the pending appeal, there are no other such appeals, interferences, or related judicial proceedings.

A Related Proceedings Appendix is appended hereto.

III STATUS OF CLAIMS (37 C.F.R. § 41.37(c) (1)(iii))

A. TOTAL NUMBER OF CLAIMS IN APPLICATION

Claims in the application are: 1, 26-38, 40-41, 45

B. STATUS OF ALL THE CLAIMS IN APPLICATION

1. Claims withdrawn from consideration: none
2. Claims pending: 1, 26-38, 40-41, 45
3. Claims allowed: None
4. Claims rejected: 1, 26-38, 40-41, 45
5. Claims cancelled: None

C. CLAIMS ON APPEAL

The claims on appeal are: 1, 26-38, 40-41, 45

IV STATUS OF AMENDMENTS (37 C.F.R. § 41.37(c)(1)(iv))

As to the status of any amendment filed subsequent to final rejection, no amendments were made.

V SUMMARY OF CLAIMED SUBJECT MATTER (37 C.F.R. § 41.37(c)(1)(v))

With respect to a summary of independent Claim 1, as described, inter alia, at p. 11, line 24 et seq., a process for producing solid energetic materials is claimed, said process utilizing sol-gel chemistry including the extraction of a liquid phase from a gel (p. 9, line 25 to p. 10, line 5) and incorporating at least one energetic material during at least one of a solution formation (p. 6, line 7 et seq., p. 13, line 23 et seq.), a gelation of the solution (p. 6, line 7 et seq., p. 13, line 23 et seq.), and the extracting of liquid from the gel (p. 6, line 12 et seq.), whereby producing a solid energetic material (Figs. 3B-3D, 4B-4C), wherein the energetic material includes a fuel and an oxidizer (Figs. 3B-3D, 4B-4C).

With respect to a summary of independent Claim 26, as described, inter alia, at p. 11, line 24 et seq., a process for producing solid energetic material which includes a volume of chemical energy is claimed, said process being carried out using sol-gel processing including extraction of a liquid phase from a gel (p. 9, line 25 to p. 10, line 5), and wherein said sol-gel processing is carried out using energetic materials selected from the group consisting of PETN (p. 10, lines 15-17), RDX (p. 10, lines 15-17), HMX (p. 10, lines 15-17), CL-20 (p. 10, lines 15-17), TNT (p. 10, lines 15-17), and a ammonium perchlorate (p. 17, line 20), whereby producing a solid energetic material.

With respect to a summary of claim 27, reference is made to the description of claim 1, above, and to p. 13, lines 24-25 and Fig. 3B, wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of solution addition to crystallize the energetic materials within pores of a sol-gel derived solid.

With respect to a summary of claim 28, reference is made to the description of claim 1, above, and to p. 6, line 12 et seq., wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of solution exchange involving exchanging the liquid phase after gelation with another liquid containing an energetic material constituent, thereby allowing deposition of the energetic material constituent within the gel.

With respect to a summary of claim 30, reference is made to the description of claim 1, above, and to p. 5, line 18 et seq., wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of a functionalized solid network which includes utilizing reactive monomers which have functionalized sites dangling throughout the solid network after gelation, and controlling the number of functionalized sites while ensuring homogeneity at a molecular level.

With respect to a summary of claim 31, reference is made to the description of claim 1, above, and to p. 6, lines 25 et seq., wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of a functionalized energy network involving functionalizing energetic material constituent molecules so that they are reacted in solution to directly form a three-dimensional solid (gel) which incorporates the energetic molecules at a finest scale.

With respect to a summary of independent Claim 32, as described, inter alia, at p. 7, line 5 et seq., a process for producing solid energetic materials utilizing sol-gel chemistry, said process comprising a micron to sub-micron (nano) composite of higher performance energetic materials which includes making solid energetic composite materials in which a skeletal structure and void spaces and the surrounding phase contains fuels, oxidizers, or other energetic composite materials (p. 7, line 5 et seq.).

With respect to a summary of claim 33, reference is made to the description of claim 1, above, and to p. 6, line 7 et seq., wherein the solution addition methodology additionally includes: dissolving energetic materials in a solvent which is compatible with a reactive monomer (p. 6, line 7 et seq.); mixing the dissolved energetic materials into a pre-gel solution (p. 6, line 7 et seq.); causing gelation of the solution wherein the energetic material is uniformly distributed within pores of a solid network formed by the polymerization of the reactive monomer (p. 6, line 7 et seq.); and allowing deposition of the energetic material within the gel (p. 6, line 7 et seq.).

With respect to a summary of claim 34, reference is made to the description of claim 1, above, and to p. 6, line 12 et seq., the solution exchange methodology additionally includes: forming a solution (p. 6, line 12 et seq.); causing gelation of the solution (p. 6, line 12 et seq.); after gelation, exchanging the liquid phase with another liquid which contains an energetic material

constituent (p. 6, line 12 et seq.); and allowing deposition of the energetic material constituent within the gel (p. 6, line 12 et seq.).

With respect to a summary of claim 36, reference is made to the description of claim 1, above, and to p. 6, line 18 et seq., the functionalized solid network methodology additionally includes: after gelation using the reactive monomers having functionalized sites dangling throughout the solid network (p. 6, line 18 et seq.); dissolving an energetic material in mutually compatible solvents and diffusing into the gel which allows the energetic material to react and bind to the functionalized site (p. 6, line 18 et seq.); and controlling the amount of energetic material by the number of functionalized sites while ensuring homogeneity at the molecular level (p. 6, line 18 et seq.).

With respect to a summary of claim 40, reference is made to the description of claim 32, above, and to p. 7, lines 9-12, forming conductive gels which form the skeletal structure and void space, and utilizing the skeletal structure as substrates for the electrochemical precipitation of metal fuels.

With respect to a summary of claim 41, reference is made to the description of claim 32, above, and to p. 7, lines 9-12, depositing metals with the skeletal structure and void spaces via decomposition from the liquid or gas phase of the process.

With respect to a summary of independent Claim 45, as described, inter alia, at p. 11, line 24 et seq., a process for producing solid energetic materials is claimed. The process includes forming a solution (p. 9, lines 22-24); gelation of the solution (p. 9, lines 22-24); extracting liquid from the gel by the technique selected from the group consisting of controlled slow evaporation of the liquid phase of the gel (p. 9, line 25 to p. 10, line 5) and supercritical extraction of the liquid phase of the gel (p. 9, line 25 to p. 10, line 5); and
incorporating at least one energetic material constituent during at least one of the solution formation (p. 6, line 7 et seq., p. 13, line 23 et seq.), the gelation of the solution (p. 6, line 7 et seq., p. 13, line 23 et seq.), and the extracting of liquid from the gel (p. 6, line 12 et seq.), and producing a solid energetic material comprising at least one of an explosive, a propellant, and a pyrotechnic (p. 5, lines 12-14, Figs. 3B-3D, 4B-4C).

Of course, the above citations are merely examples of the above claim language and should not be construed as limiting in any manner.

VI GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL (37 C.F.R. § 41.37(c)(1)(vi))

Following, under each issue listed, is a concise statement setting forth the corresponding ground of rejection.

Issue # 1: Claims 1, 26-38, 40, 41 and 45 have been rejected under 35 USC 103(a) as being unpatentable over US4952341 to Sayles (hereinafter "Sayles") or US4481371 to Benziger (hereinafter "Benziger") in view of the article to Hench et al. entitled "The Sol Gel Process" (hereinafter "Hench"), and in further view of the article from Science and Technology review, and in yet further view of (purported) Applicant Admitted Prior Art (AAPA).

Issue # 2: Claims 1, 32 and 45 have been rejected under 35 USC 102(b) as being anticipated by the article from Science and Technology Review.

VII ARGUMENT (37 C.F.R. § 41.37(c)(1)(vii))

The claims of the groups noted below do not stand or fall together. In the present section, appellant explains why the claims of each group are believed to be separately patentable.

Issue # 1:

Claims 1, 26-38, 40, 41 and 45 have been rejected under 35 USC 103(a) as being unpatentable over US4952341 to Sayles (hereinafter "Sayles") or US4481371 to Benziger (hereinafter "Benziger") in view of the article to Hench et al. entitled "The Sol Gel Process" (hereinafter "Hench"), and in further view of the article from Science and Technology review, and in yet further view of (purported) Applicant Admitted Prior Art (AAPA).

Group #1: Claims 1, 26, 29, 35, 37-38

Claims 1, 26, 29, 35, 37-38

In the final office action mailed June 3, 2008, claims 1, 26, 29, 35, 37-38 were rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the *Graham* test.

The analysis of obviousness was set forth in *Graham v. John Deere*, 383 U.S. 1, 148 USPQ 459 (1966). In order to establish a *prima facie* case of obviousness, three basic criteria must be met:

> First, there must be some *suggestion or motivation*, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine the teachings of the references. Second, there must be a reasonable expectation of success. Finally, the prior art reference or combined references must teach or suggest *all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art*, and *not based on applicant's disclosure* (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991; *emphasis added*).

Appellants respectfully traverse the rejection as failing the *Graham* test. Specifically, the combination proposed in the rejection fails at least the first and third elements of the *Graham* test.

Regarding the first element of the *Graham* test, the law requires predictability before an invention will be deemed obvious. In the instant case, the claimed invention would not have been predictable from the bare teachings of the prior art itself, or in knowledge generally known to those skilled in the art. The United States Supreme Court has acknowledged that there is no obviousness where the end result is unpredictable. In the recent case, *KSR International v. Teleflex Inc.*, 127 S.Ct. 1727 (2007), the Court's analysis included by implication the traditional notion that evidence of unpredictable results is evidence of non-obviousness. Therefore, even though the Court made sweeping changes to the obviousness analysis, it acknowledged that if the result of the proposed modification or combination of features is unpredictable, there is no obviousness.

The courts have repeatedly stated that the chemical arts are, by their very nature, unpredictable. This case is no different. The claimed invention is well within the chemical arts, and so is, by its very nature, unpredictable. Besides the inherent unpredictability recognized time and again by the courts, and as further proof of unpredictability, the present application also notes such unpredictability. Reference is made to p. 10, line 25 et seq., which describes how, in a preliminary proof of principle experiment, the presence of the gel structure dramatically decreased the impact sensitivity of an explosive. This result was counter to that expected, and thus, unpredictable.

In the instant rejection, it has not been shown that the materials disclosed by Benziger or Sayles could even be incorporated into a sol-gel process to form a solid energetic material, absent the teachings of the present application. For example, Benziger indicates that the high explosive TATB is formed by animating TCTNB. Particularly, the TCTNB is added to an emulsion of immiscible liquids (as oil in water), namely toluene and water. The TCTNB, when added to the emulsion, resides in the toluene droplets dispersed in the water. The size of the toluene droplets determines the size of the resulting TATB particles. While the actual result of adding Benziger's emulsion to a sol-gel process is unpredictable, it seems likely that the particles thus formed would be loose particles, while a goal of sol-gel chemistry is to create a solid

skeleton. In sharp contrast, all of Benziger's examples require agitation to form the TATB, which is believed to be detrimental to formation of a solid skeleton, i.e., they would be shaken apart by the agitation. Thus, the rejection makes assumptions that are unsupported and unpredictable.

Also regarding the first element of the *Graham* test, the law is clear: the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

In the instant rejection, the Examiner relies on purported Applicant Admitted Prior Art (AAPA) to provide the motivation for the proposed combination of features. Particularly, the thrust of the motivation, as understood, is that since Appellants' disclosure states that the "composition of the aerogels or xerogels is varied by the sol-gel processing, whereby various surface areas, densities, etc. can be produced", one skilled in the art would have been motivated to use materials from other references with sol-gel processing to create the claimed invention.

Appellants respectfully challenge use of the present disclosure as motivation to combine features of any of the references. The law is clear: the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. Here, the motivation is clearly based on Appellants' disclosure, in direct contravention of *Graham*.

Moreover, as noted above, no showing has been made that the materials disclosed by Benziger or Sayles could even be incorporated into a sol-gel process to form a solid energetic material, absent the teachings of the present application. Thus, it appears that the Examiner relies on the teachings of the present application to combine the various parts of the numerous references.

For any of the foregoing reasons, the rejection of claims 1, 26, 29, 35, 37-38, 45 is improper as failing the first prong of the *Graham* test.

Group #2: Claim 27

Claim 27

In the final office action mailed June 3, 2008, claim 27 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests that materials are crystallized within pores of a sol-gel derived solid.

Therefore, the rejection is erroneous.

Additionally, claim 27 depends from claim 1, and therefore incorporates the limitations of claim 1. The rejection of claim 1 is erroneous as set forth above. By virtue of its dependence, claim 27 is also believed to be allowable. If an independent claim is nonobvious under 35 U.S.C. 103, then any claim depending therefrom is nonobvious. *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988).

Group #3: Claim 28

Claim 28

In the final office action mailed June 3, 2008, claim 28 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

Regarding claim 28, the rejection fails to indicate where, if anywhere, the art of record teaches or suggests solution exchange involving exchanging the liquid phase after gelation with another liquid containing an energetic material constituent, thereby allowing deposition of the energetic material constituent within the gel.

Therefore, the rejection is erroneous.

Additionally, claim 28 depends from claim 1, and therefore incorporates the limitations of claim 1. The rejection of claim 1 is erroneous as set forth above. By virtue of its dependence, claim 28 is also believed to be allowable.

Group #4: Claim 30

Claim 30

In the final office action mailed June 3, 2008, claim 30 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests utilizing reactive monomers which have functionalized sites dangling throughout the solid network after gelation, and controlling the number of functionalized sites while ensuring homogeneity at a molecular level.

Therefore, the rejection is erroneous.

Additionally, claim 30 depends from claim 1, and therefore incorporates the limitations of claim 1. The rejection of claim 1 is erroneous as set forth above. By virtue of its dependence, claim 30 is also believed to be allowable.

Group #5: Claim 31

Claim 31

In the final office action mailed June 3, 2008, claim 31 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests that sol-gel chemistry is carried out utilizing a methodology consisting of a functionalized energy network involving functionalizing energetic material constituent molecules so that they are reacted in solution to directly form a three-dimensional solid (gel) which incorporates the energetic molecules at a finest scale

Therefore, the rejection is erroneous.

Additionally, claim 31 depends from claim 1, and therefore incorporates the limitations of claim 1. The rejection of claim 1 is erroneous as set forth above. By virtue of its dependence, claim 31 is also believed to be allowable.

Group #6: Claim 32

Claim 32

In the final office action mailed June 3, 2008, claim 32 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

Regarding claim 32, Appellants respectfully assert that the rejection is improper. Particularly, claim 32 fails the third prong of the *Graham* test.

Claim 32 requires making solid energetic composite materials in which a skeletal structure and void spaces and the surrounding phase contains fuels, oxidizers, or other energetic composite materials.

In sharp contrast, the art of record fails to disclose or suggest solid energetic composite materials in which a skeletal structure and void spaces and the surrounding phase contains fuels, oxidizers, or other energetic composite materials. For example, Heinz discusses drying to remove all material from the pores. *See e.g.*, Heinz p. 36, col. 2 to p. 37, col. 1 (overview).

Similarly, the article from Science and Technology Review fails to disclose whether any material is present in the void spaces, much less fuels, oxidizers, or other energetic composite materials.

For the foregoing reasons, the rejection fails the third element of the *Graham* test and must be withdrawn.

Group #7: Claim 33

Claim 33

In the final office action mailed June 3, 2008, claim 33 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests wherein the energetic material is uniformly distributed within pores of a solid network formed by the polymerization of the reactive monomer.

Therefore, the rejection is erroneous.

Additionally, claim 33 depends from claim 1, and therefore incorporates the limitations of claim 1. The rejection of claim 1 is erroneous as set forth above. By virtue of its dependence, claim 33 is also believed to be allowable.

Group #8: Claim 34

Claim 34

In the final office action mailed June 3, 2008, claim 34 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests after gelation, exchanging the liquid phase with another liquid which contains an energetic material constituent.

Therefore, the rejection is erroneous.

Additionally, claim 34 depends from claim 1, and therefore incorporates the limitations of claim 1. The rejection of claim 1 is erroneous as set forth above. By virtue of its dependence, claim 34 is also believed to be allowable.

Group #9: Claim 36

Claim 36

In the final office action mailed June 3, 2008, claim 36 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests utilizing reactive monomers which have functionalized sites dangling throughout the solid network, and dissolving an energetic material in mutually compatible solvents and diffusing into the gel which allows the energetic material to react and bind to the functionalized site.

Therefore, the rejection is erroneous.

Additionally, claim 36 depends from claim 1, and therefore incorporates the limitations of claim 1. The rejection of claim 1 is erroneous as set forth above. By virtue of its dependence, claim 36 is also believed to be allowable.

Group #10: Claim 40

Claim 40

In the final office action mailed June 3, 2008, claim 40 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests forming conductive gels which form the skeletal structure and void space, and utilizing the skeletal structure as substrates for the electrochemical precipitation of metal fuels. For this reason as well, the claim is believed to be allowable.

Therefore, the rejection is erroneous.

Additionally, claim 40 depends from claim 32, and therefore incorporates the limitations of claim 32. The rejection of claim 32 is erroneous as set forth above. By virtue of its dependence, claim 40 is also believed to be allowable.

Group #11: Claim 41

Claim 41

In the final office action mailed June 3, 2008, claim 41 was rejected under 35 USC 103(a) as being unpatentable over Sayles or Benziger in view of Hench, and in further view of the article from Science and Technology review, and in yet further view of (purported) AAPA.

Appellants respectfully assert that the rejection fails the third prong of the *Graham* test.

The rejection fails to indicate where, if anywhere, the art of record teaches or suggests depositing metals with the skeletal structure and void spaces via decomposition from the liquid or gas phase of the process. For this reason as well, the claim is believed to be allowable.

Therefore, the rejection is erroneous.

Additionally, claim 41 depends from claim 32, and therefore incorporates the limitations of claim 32. The rejection of claim 32 is erroneous as set forth above. By virtue of its dependence, claim 41 is also believed to be allowable.

Issue # 2:

Claims 1, 32 and 45 have been rejected under 35 USC 102(b) as being anticipated by the article from Science and Technology Review.

Group #1: Claim 1

Claim 1

In the final office action mailed June 3, 2008, claim 1 was rejected under 35 USC 102(b) as being anticipated by the article from Science and Technology Review.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Moreover, the identical invention must be shown in as complete detail as contained in the claim. *Richardson v. Suzuki Motor Co.* 868 F.2d 1226, 1236, 9USPQ2d 1913, 1920 (Fed. Cir. 1989). The elements must be arranged as required by the claim. *In re Bond*, 910 F.2d 831, 15 USPQ2d 1566 (Fed. Cir. 1990).

Claim 1 requires whereby producing a solid energetic material, wherein the energetic material includes a fuel and an oxidizer. In sharp contrast, the rejection cites air as the oxizider. However, air is not a solid energetic material. Therefore, the rejection violates the rule of *Verdegaal Bros.* and *Richardson, supra,* and must be overturned.

Group #2: Claim 32

Claim 32

In the final office action mailed June 3, 2008, claim 32 was rejected under 35 USC 102(b) as being anticipated by the article from Science and Technology Review.

Regarding claim 32, Appellants respectfully disagree that the article from Science and Technology Review discloses each and every limitation of the claim.

Claim 32 requires making solid energetic composite materials in which a skeletal structure and void spaces and the surrounding phase contains fuels, oxidizers, or other energetic composite materials. In sharp contrast, assuming *arguendo* that the article from Science and Technology Review discloses carbon as part of the solid structure and air in the voids, the article still fails to disclose whether any material is present in the void spaces, much less fuels,

oxidizers, or other energetic composite materials. Therefore, the rejection violates the rule of *Verdegaal Bros.* and *Richardson, supra,* and must be overturned.

Group #3: Claim 45

Claim 45

In the final office action mailed June 3, 2008, claim 45 was rejected under 35 USC 102(b) as being anticipated by the article from Science and Technology Review.

Claim 45 requires producing a solid energetic material comprising at least one of an explosive, a propellant, and a pyrotechnic. The rejection states that air and carbon function as propellants. However, air is not part of a solid energetic material. Therefore, the rejection violates the rule of *Verdegaal Bros.* and *Richardson, supra,* and must be overturned.

In view of the remarks set forth hereinabove, all of the independent claims are deemed allowable, along with any claims depending therefrom.

VIII CLAIMS APPENDIX (37 C.F.R. § 41.37(c)(1)(viii))

The text of the claims involved in the appeal is set forth below:

1. A process for producing solid energetic materials,

said process utilizing sol-gel chemistry including the extraction of a liquid phase from a gel and incorporating at least one energetic material during at least one of a solution formation, a gelation of the solution, and the extracting of liquid from the gel, whereby producing a solid energetic material, wherein the energetic material includes a fuel and an oxidizer.

2.-25. (Canceled)

26. A process for producing solid energetic material which includes a volume of chemical energy,

said process being carried out using sol-gel processing including extraction of a liquid phase from a gel, and wherein said sol-gel processing is carried out using energetic materials selected from the group consisting of PETN, RDX, HMX, CL-20, TNT, and a ammonium perchlorate, whereby producing a solid energetic material.

27. The process of Claim 1, wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of solution addition to crystallize the energetic materials within pores of a sol-gel derived solid.

28. The process of Claim 1, wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of solution exchange involving exchanging the liquid phase after gelation with another liquid containing an energetic material constituent, thereby allowing deposition of the energetic material constituent within the gel.

29. The process of Claim 1, wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of powder/particle additions involving mixing a

particulate form of an energetic constituent with a pre-gel solution or adding to a pre-made gel resulting in a composite of gel and suspended particles.

30. The process of Claim 1, wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of a functionalized solid network which includes utilizing reactive monomers which have functionalized sites dangling throughout the solid network after gelation, and controlling the number of functionalized sites while ensuring homogeneity at a molecular level.

31. The process of Claim 1, wherein utilizing sol-gel chemistry is carried out utilizing a methodology consisting of a functionalized energy network involving functionalizing energetic material constituent molecules so that they are reacted in solution to directly form a three-dimensional solid (gel) which incorporates the energetic molecules at a finest scale.

32. A process for producing solid energetic materials utilizing sol-gel chemistry, said process comprising a micron to sub-micron (nano) composite of higher performance energetic materials which includes making solid energetic composite materials in which a skeletal structure and void spaces and the surrounding phase contains fuels, oxidizers, or other energetic composite materials.

33. The process of Claim 27, wherein the solution addition methodology additionally includes:

dissolving energetic materials in a solvent which is compatible with a reactive monomer;

mixing the dissolved energetic materials into a pre-gel solution;

causing gelation of the solution wherein the energetic material is uniformly distributed within pores of a solid network formed by the polymerization of the reactive monomer; and

allowing deposition of the energetic material within the gel.

34. The process of Claim 28, wherein the solution exchange methodology additionally includes:

forming a solution;

causing gelation of the solution;

after gelation, exchanging the liquid phase with another liquid which contains an energetic material constituent; and

allowing deposition of the energetic material constituent within the gel.

35. The process of Claim 29, wherein the powder/particle addition methodology additionally includes:

providing an energetic material in powder or particulate form;

either mixing the powder or particulate energetic material with a pre-gel solution or adding to a pre-made gel, thereby resulting in a composite of gel and suspended particles.

36. The process of Claim 30, wherein the functionalized solid network methodology additionally includes:

after gelation using the reactive monomers having functionalized sites dangling throughout the solid network;

dissolving an energetic material in mutually compatible solvents and diffusing into the gel which allows the energetic material to react and bind to the functionalized site; and

controlling the amount of energetic material by the number of functionalized sites while ensuring homogeneity at the molecular level.

37. The process of Claim 31, wherein the functionalized energetic network methodology additionally includes:

providing energetic material constituent molecules;

functionalizing the energetic material constituent molecules; and

functionalizing the energetic material constituent molecules so that they can be reacted in solution to directly form a three-dimensional solid or gel network which incorporates the energetic material molecules at the finest scale.

38. The process of Claim 37, wherein the solid network is the energetic material and controls the concentration by co-reacting with other inert reactive monomers.

39. (Canceled)

40. The process of Claim 32, additionally including forming conductive gels which form the skeletal structure and void space, and utilizing the skeletal structure as substrates for the electrochemical precipitation of metal fuels.

41. The process of Claim 32, additionally including depositing metals with the skeletal structure and void spaces via decomposition from the liquid or gas phase of the process.

42. - 44. (Canceled)

45. A process for producing solid energetic materials which includes:

forming a solution;

gelation of the solution;

extracting liquid from the gel by the technique selected from the group consisting of controlled slow evaporation of the liquid phase of the gel and supercritical extraction of the liquid phase of the gel; and

incorporating at least one energetic material constituent during at least one of the solution formation, the gelation of the solution, and the extracting of liquid from the gel, and

producing a solid energetic material comprising at least one of an explosive, a propellant, and a pyrotechnic.

IX EVIDENCE APPENDIX (37 C.F.R. § 41.37(c)(1)(ix))

There is no such evidence.

X RELATED PROCEEDING APPENDIX (37 C.F.R. § 41.37(c)(1)(x))

N/A

In the event a telephone conversation would expedite the prosecution of this application, the Examiner may reach the undersigned at (408) 971-2573. For payment of any additional fees due in connection with the filing of this paper, the Commissioner is authorized to charge such fees to Deposit Account No. 50-1351 (Order No. LLNLP001).

Respectfully submitted,

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